

REMARKS

The specification has been amended to delete a reference numeral. The drawings have been revised to include a "Prior Art" legend for Figs. 1A 1B, and 1C, as discussed further herein.

Claims 1 and 5 have been amended to more particularly point out that the catalyst washcoat is thicker on the perimeter walls than on the interior walls, as taught, for example, at page 6, lines 9-12. In addition, claims 1 and 2 have been amended to delete "selectively," as discussed further herein. Claims 5, 6 and 7 are amended to more particularly point out that Applicants' method includes the step of applying the washcoat so that the thickness is greater on perimeter walls than on interior walls, as taught, for example, at page 6, lines 10-12, and page 7, beginning at line 3.

Objection to Drawings

The drawings were objected to in that Figures 1A-1C should be designated as Prior Art. The replacement sheets submitted herewith are revised to include "Prior Art" legends for Figs. 1A -1C. Accordingly, It is respectfully requested that the amended drawings be entered and the objection be withdrawn.

Objection to Disclosure

An objection is made to an unclear reference numeral at page 6 of the specification. The specification is amended to delete the reference numeral. Applicants request that the objection be withdrawn.

Claim Rejection under 35 USC § 112

Claims 1 through 9 were rejected under 35 U.S.C. § 112 as indefinite. In particular, the term “selectively” in claims 1, 2, 5 and 6 was deemed vague. The claims have been amended to delete the objectionable term and more particularly point out that the washcoat is thicker on perimeter walls than on interior walls. In view of the amendments, it is respectfully requested that the rejection under Section 112 be withdrawn and that the claims be allowed.

Claim Rejection under 35 USC § 102(b) based on Gerhold

Claims 1-2 and 5-6 were rejected under 35 U.S.C. § 102(b) as anticipated by United States Patent No. 3,903,341, issued to Gerhold in 1975.

Gerhold shows a honeycomb element 3 in Figure 1 wherein the cells have curved walls. When used in an automotive catalytic converter, the element may include catalyst coating, col. 4, lines 4-12. The cells may also include a suitable refractory inorganic oxide applied to the wall surface prior to the catalyst component, col. 4, lines 12-22. Such refractory coatings are commonly referred to in the art as washcoats. However, nothing in Gerhold contemplates varying the refractory coating thickness between different cells. In Applicants' invention, the washcoat thickness is varied such that the washcoat is thicker on perimeter walls than on interior walls. Without this feature, Gerhold cannot teach or suggest Applicants' invention.

Claim 1 is directed to Applicants' catalytic converter substrate that includes a catalyst substrate and a catalyst washcoat. In accordance with the claim, the washcoat is thicker on perimeter walls than on interior walls. Gerhold describes substrates having curved walls, but contemplates a conventional coating having a uniform thickness. Therefore, Gerhold does not teach or suggest Applicants' catalytic converter structure as set forth in claim 1.

Claim 2 is dependent upon claim 1 and is not shown by Gerhold for the reasons set forth with regard to that claim.

Claim 5 is directed to Applicants' method that includes applying a catalyst washcoat on the walls such that the thickness on perimeter walls is greater than on interior walls. As described above, nothing in Gerhold points to applying a washcoat with varying thicknesses. Therefore, Gerhold cannot teach or even suggest Applicants' method in claim 5 or in claim 6 dependent thereon.

Accordingly, it is respectfully requested that the rejection of the claims based upon Gerhold be reconsidered in view of the amendments thereto and withdrawn, and that the claims be allowed.

Claim Rejection under 35 USC § 102(b) based on Machida et al.

Claims 1-2, 4-6, and 8 were rejected under 35 U.S.C. § 102(b) as anticipated by United States Patent No. 5,494,881, issued to Machida et al. in 1996.

Machida et al. shows a ceramic honeycomb structural body, i.e., 10 in Fig. 1, comprising thin partition walls. More particularly, the structure is characterized by particular relationships between partition wall thickness, open frontal area and bulk density, see col. 7, lines 13-20 and 30-33. The body may be used as a catalyst carrier, and when so used, may be coated with an alumina or similar base and a catalytic substance, col. 6, lines 58-66. This is commonly referred to as a catalyst washcoat. Machida et al. contemplates a coating that is uniformly applied to the partition walls, and nowhere points to a process that would vary the coating thickness. This is in marked contrast to the present invention wherein the washcoat thickness is varied between perimeter cells and interior cells. Without this feature, Machida cannot teach or suggest Applicants' invention.

Applicants' claim 1 calls for a substrate and a catalyst washcoat, wherein the washcoat is thicker on perimeter walls than on interior walls of the substrate. Nothing in Machida et al. suggests varying the washcoat thickness on partition walls in different cross-sectional regions of the substrate. Therefore, Machida et al. does not anticipate Applicants' claim 1. Similarly, it follows that it does not anticipate claims 2 and 4 dependent thereon.

Independent claim 5 is directed to Applicants' method that includes applying a thicker catalyst washcoat on perimeter walls than on interior walls. Machida et al. does not suggest any process that would vary the coating between the interior and perimeter walls. Therefore, Machida et al. does not anticipate Applicants' claim 5, or claims 6 and 8 dependent thereon.

Accordingly, it is respectfully requested that the rejection of the claims based upon Machida et al. be reconsidered in view of the amendments thereto and withdrawn, and that the claims be allowed.

Claim Rejection under 35 USC § 102(b) based on Ogawa et al.

Claims 1-2, 4-6, and 9 were rejected under 35 U.S.C. § 102(b) as anticipated by United States Patent No. 4,455,336, issued to Ogawa et al. in 1984.

Referring to Fig. 2B of Ogawa et al., a ceramic honeycomb structural body comprises walls 5 at the outer peripheral that are treated to reduce the porosity, col. 2, lines 47-51, and improve wall strength, col. 1, lines 56-60. Referring to Fig. 1B, the reinforcing material fills the pores without covering the outer wall surface. Indeed, superfluous slurry is removed by compressed air so as to leave the walls uncoated, col. 3, lines 18-20. However, nothing in the patent contemplates applying a catalyst washcoat to the walls. Such washcoat would also fill the pores, rendering the treatment unnecessary. Rather, Ogawa et al. uses a process wherein the catalyst is applied to impregnate the pores in base material. Such systems are known and take advantage of the inherent porosity of the base material. However, significantly, they do not use a washcoat. In contrast, Applicants' invention relates to a catalytic converter substrate that does use a washcoat. Such washcoats are preferred in modern automotive catalytic converters for a variety of reasons well known in the art. Nothing in Ogawa contemplates a washcoat, nor is the use of a washcoat consistent with the treatment that is described therein. Therefore, Ogawa et al. does not anticipate, or even suggest Applicants' invention.

Claim 1 is directed to a catalytic converter substrate that includes a substrate and a catalyst washcoat. In Ogawa et al., the substrate is impregnated with the catalyst without a washcoat, which would otherwise fill pores throughout the body and render the treatment disclosed therein meaningless. Since Ogawa et al. does not show a washcoat, and is not consistent with the use thereof, it follows it cannot show varying the washcoat thicknesses within different passages. Thus, it cannot anticipate, or even suggest, claim 1, or dependent claims 2 and 4.

Claim 5 is directed to Applicants' method that includes applying a catalyst washcoat on the walls such that the thickness on perimeter walls is greater than on interior walls. As described above, Ogawa et al. does not show a washcoat, and does not show varying the washcoat thickness. Therefore, Ogawa et al. cannot teach or even suggest Applicants' method in claim 5 or in dependent claims 6 and 9.

Therefore, it is respectfully requested that the rejection of the claims based upon Ogawa et al. be reconsidered and withdrawn, and that the claims be allowed.

Claim Rejection under 35 USC § 103 based upon Ogawa et al. and Machida et al.

Claims 3-4 and 7-8 were rejected under 35 U.S.C. § 103 as unpatentable over Ogawa et al. in view of Machida et al.

Claims 3 and 4 are dependent upon claim 1, whereas claims 7 and 8 are dependent upon claim 5. For the reasons set forth with regard to the rejection of the independent claims, Ogawa et al. does not show a washcoat, describes a treatment that fills pores in the base material without leaving a coating on the surface, and would not appear consistent with the use of a washcoat that would fill the pores anyway, even in sections where open porosity is desired. Thus, there is nothing in Ogawa et al to point a practitioner to use the washcoat of Machida et al. Moreover, there is nothing in Machida et al. to suggest that washcoat thickness is a factor in strengthening substrate walls. Thus, neither reference, nor their combination, can be fairly read as pointing the practitioner to apply a washcoat with varying thickness in different cross sectional regions to strengthen the substrate, key features of the present invention.

Claim 1 calls for a catalyst substrate on perimeter walls and interior walls such that the thickness is greater on perimeter walls. Ogawa et al. does not apply a washcoat, does not apply any coating or treatment to interior walls, and treats selected walls only to fill porosity without forming a coating thereon. Moreover, nothing in Ogawa et al. suggests that varying the washcoat thickness would be effective to strengthen walls in selected regions of the substrate. Machida et al contemplates a washcoat having a uniform thickness, and so cannot suggest varying washcoat thickness to selectively strengthen the perimeter walls. Thus, the references combined fail to point to this key feature of the present invention. Without this, the references cannot be fairly read as obviating Applicants' invention in claim 1 or in dependent claims 3 and 4.

In accordance with claim 5, which is directed to Applicants' method, a catalyst washcoat is applied so that the thickness is greater on the perimeter walls. As discussed above, this feature is not found in the washcoat-free body of Ogawa et al. or the uniform washcoat of Machida et al. It follows that the references cannot then show Applicants method in dependent claims 7 and 8 that necessarily incorporate the features of claim 5.

Therefore, it is respectfully requested that the rejection of the claims 3-4 and 7-8 under 35 U.S.C. § 103 be reconsidered and withdrawn, and that the claims be allowed.

Claim Rejection under 35 USC § 103 based upon Gerhold and Machida et al.

Claims 3 and 7 were rejected under 35 U.S.C. § 103 as unpatentable over Gerhold or Machida et al.

As discussed hereinabove, both Gerhold and Machida et al. contemplate a washcoat having a uniform thickness. Nothing in either reference suggests varying the thickness in cross sectional regions to strengthen the substrate. Thus, even if combined, there is nothing in the combined teachings to point to Applicants' invention.

Claim 1, upon which claim 3 depends, calls for a catalytic converter substrate having a catalyst washcoat with a greater thickness on perimeter walls than on interior walls. Similarly, claim 7, which depends on claim 5, calls for applying a catalyst washcoat that is thicker on perimeter walls than on interior walls. Gerhold and Machida et al contemplate a uniform washcoat and so do not show this feature. Therefore, the references do not suggest Applicants' claims.

Therefore, it is respectfully requested that the rejection of the claims 3 and 7 under 35 U.S.C. § 103 be reconsidered and withdrawn, and that the claims be allowed.

Claim Rejection under 35 USC § 103 based upon Gerhold, Machida et al. and Abe et al.

Claim 9 was rejected under 35 U.S.C. § 103 as unpatentable over Gerhold or Machida et al. in view of United States Patent No. 4,294,806, issued to Abe et al. in 1981.

Claim 9 is dependent upon claim 5. For the reasons set forth above, neither Gerhold nor Machida et al nor their combination shows a washcoat having varying thicknesses as in Applicant's invention. Abe et al. is cited to show a vitreous process. However, there is nothing in Abe et al. to show a coating that is thicker in the perimeter than in the interior. Therefore, Abe et al. does not make up the deficiencies in the primary references.

Accordingly, the features of claim 5, as incorporated in dependent claim 9, are not shown by Gerhold or Machida et al., even with the combination of Abe et al. Therefore, it is respectfully requested that the rejection of the claims 9 be withdrawn, and that the claim be allowed.

Conclusion

It is believed, in view of the amendments and remarks herein, that all grounds of rejection of the claims have been addressed and overcome, and that all claims are in condition for allowance. If it would further prosecution of the application, the Examiner is urged to contact the undersigned at the phone number provided.

The Commissioner is hereby authorized to charge any fees associated with this communication to Deposit Account No. 50-0831.



Respectfully submitted,

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